BeeGFS Basics

A BeeGFS filesystem is a parallel cluster filesystem managed with the BeeGFS software. BeeGFS architecture is composed of four main services:

Management Service
: A very lightweight service for maintaining a list of all other BeeGFS services and their states.

Metadata Service
: Stores information about the data, such as directory information, file and directory ownership, and location of the user file contents on the storage targets. When a client opens a file, the metadata service provides the stripe pattern to the client. Metadata service is not involved in data read or write operations.

  There can be many server instances providing metadata services in a BeeGFS filesystem. Each service is responsible for its exclusive fraction of the global namespace. Having more metadata servers improves the overall system performance. Also, using faster processor cores for the metadata will have lower metadata access latency, providing better performance.

Storage Service
: Also referred to as the *object storage service*, this service stores striped user file contents.

  A storage server instance has one or more storage targets. The storage targets can be hard disk drives (HDDs) or the flash memory of solid state drives (SSDs).

  One strength of BeeGFS is its better performance compared to other filesystems in handling small I/O. This is because it automatically uses all available RAM on the storage servers for caching, so small I/O requests are aggregated into large blocks before the data is written to disk.

Client Service
: Mounts the filesystem to access the stored data. A BeeGFS client can be installed or updated without a system reboot.

Using the BeeGFS Command

The BeeGFS command beegfs-ctl can be used to perform administrative functions and show statistics:

```
pfe% which beegfs-ctl
/usr/bin/beegfs-ctl
```

To view beegfs-ctl options, run:

```
pfe% beegfs-ctl --help
```

BeeGFS Command Examples

To use these commands, you must specify a BeeGFS filesystem, using the --cfgFile option. In the examples, the Pleiades BeeGFS filesystem /nobackupp3 (nbp3) is specified.

- List the storage targets and their state:

  ```
  pfe% beegfs-ctl --listtargets --cfgFile=/etc/beegfs/beegfs-nbp3.conf --state --longnodes
  ```

- Find the total, free and % free space of the storage targets:

  ```
  pfe% beegfs-ctl --listtargets --cfgFile=/etc/beegfs/beegfs-nbp3.conf  --longnodes --spaceinfo
  ```

- Find stripe pattern details of a directory or a file:

  ```
  pfe% beegfs-ctl --getentryinfo --cfgFile=/etc/beegfs/beegfs-nbp3.conf /path/to/file/or/directory
  ```

- List the node(s) used as metadata server(s):

  ```
  pfe% beegfs-ctl --listnodes --nodetype=meta --cfgFile=/etc/beegfs/beegfs-nbp3.conf
  ```

- List the nodes used as storage servers:

  ```
  pfe% beegfs-ctl --listnodes --nodetype=storage --cfgFile=/etc/beegfs/beegfs-nbp3.conf
  pfe% beegfs-ctl --listnodes --nodetype=storage --cfgFile=/etc/beegfs/beegfs-nbp3.conf --details
  ```

- List the storage pools:

  ```
  pfe% beegfs-ctl --liststoragepools --cfgFile=/etc/beegfs/beegfs-nbp3.conf
  ```

Additional Resources

- Pleiades BeeGFS Filesystem
- Introduction to BeeGFS (PDF)

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https://www.nas.nasa.gov/hecc/support/kb/entry/625/